



# Virgin Galactic

Emerging Commercial Suborbital  
Capabilities Workshop  
NASA Goddard Space Flight Center

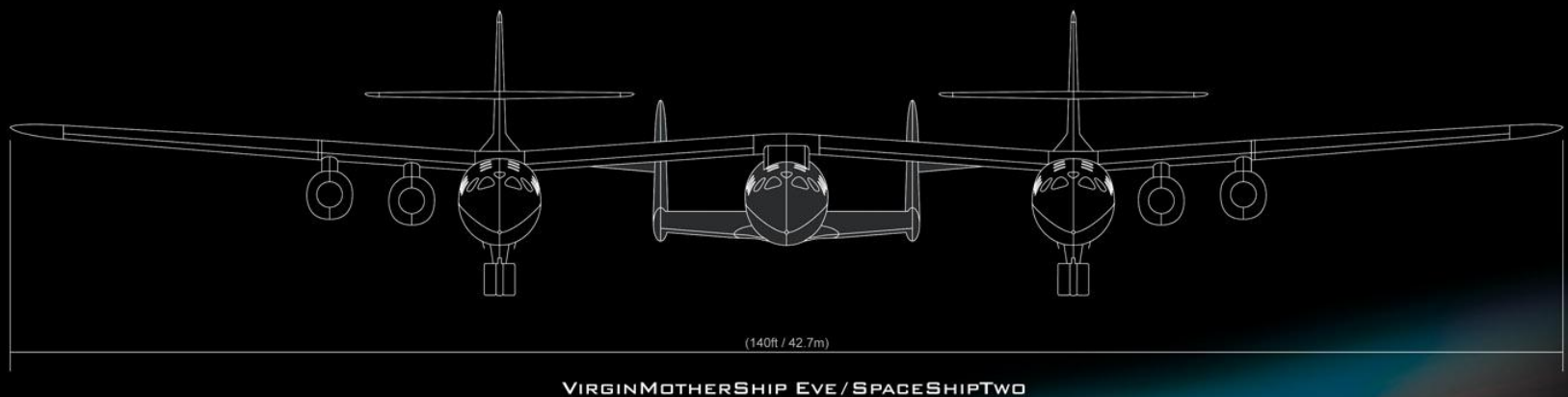
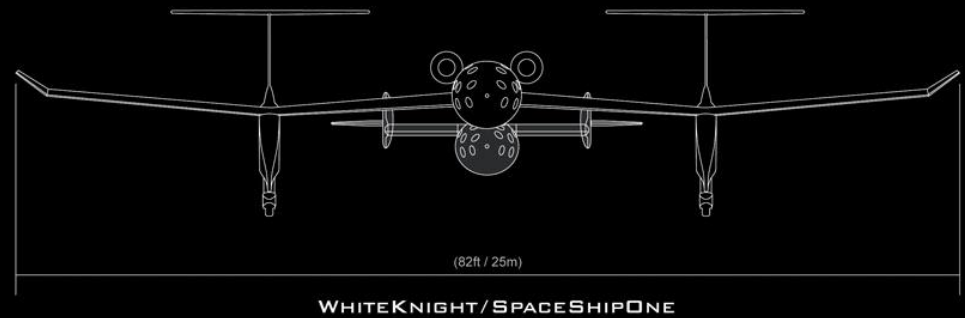
07 September 2011

# The Existence Proof





## SCALE COMPARISON

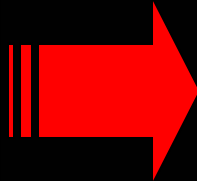




# Making Commercial Vehicles: The Spaceship Company (TSC)



**Design / Build / Test  
Prototype Vehicles**

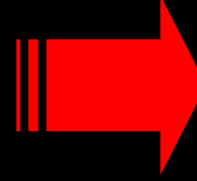


# TSC

THE SPACESHIP COMPANY



**Build Commercial  
Vehicles**



**Fly Vehicles in  
Service**

**The roles of Scaled, TSC, and Virgin  
Galactic are complementary**



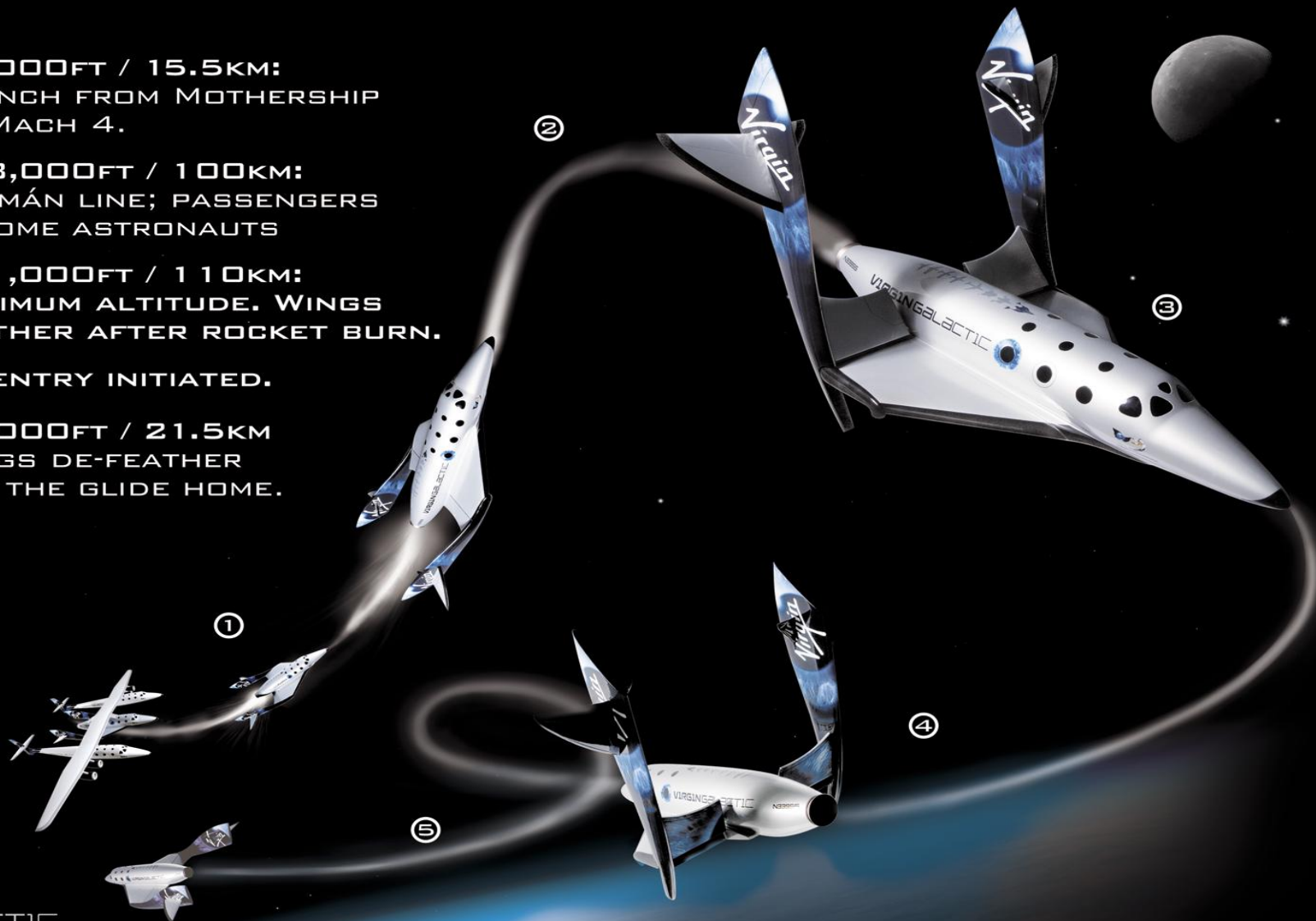




# Mission Profile



- ① 50,000FT / 15.5KM:  
LAUNCH FROM MOTHERSHIP  
TO MACH 4.
- ② 328,000FT / 100KM:  
KÁRMÁN LINE; PASSENGERS  
BECOME ASTRONAUTS
- ③ 361,000FT / 110KM:  
MAXIMUM ALTITUDE. WINGS  
FEATHER AFTER ROCKET BURN.
- ④ RE-ENTRY INITIATED.
- ⑤ 70,000FT / 21.5KM  
WINGS DE-FEATHER  
FOR THE GLIDE HOME.





# Flight Testing Now

- 72 flights of WK2 mothership
- 12 captive carry flights of SS2
- 15 glide tests of SS2 (2 feathered)
- 7 ground firings of full scale





# WK2 Capabilities

- Carry (or drop) 30,000 lb payload from 50,000 feet
- Center pylon allows for large payloads
- Can accommodate large volumes of instrumentation on frequent flights
- Common cabins with SpaceShipTwo
- Capable of long distance ferrying flights and other missions





# SS2 Overview

- Crew of 8 to 110km (361,000 feet)
- Max speed ~ Mach 3.5
- Large passenger cabin
  - Cylinder diameter ~7.5 feet, length 12 feet
  - 12 passenger windows, 5 pilot windows
- Carefree re-entry and glider return





Virgin

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